

95-D-102, CMR Upgrades Project, Los Alamos National Laboratory, Los Alamos, New Mexico

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

| # The Chemistry and Metallurgy Research (CMR) Upgrades Project has completed a revised baseline based on updated project objectives. In December 1997, a re-evaluation began to determine necessary upgrades, within allocated funding, to support safe operations of the facility through FY 2010. In March 1998, a DOE-Los Alamos National Laboratory (LANL) workshop focused on required upgrades driven by the facility Basis for Interim Operations/Technical Safety Requirements (BIO/TSRs). Subsequently, in July 1998 another DOE-LANL workshop was held that focused on risk reduction and operability/reliability improvements. The third and final workshop was held in May 1999 to finalize the revised scope of the CMR facility upgrades. The final list of upgrades and the revised baseline is based on BIO/TSR, public and worker safety, and programmatic requirements.

| During the interim, the project proceeded with incremental authorizations to design and construct upgrades, identified as necessary in the first workshop, to address public safety risks and compliance until the finalization of the CMR facility upgrades scope and re-baselining effort was complete.

| In January 1999, the DOE approved the “Strategy for Managing Risks at the CMR” documenting the risk mitigation measures (including the CMR Upgrades Project) required to safely operate the CMR through 2010. This strategy, along with the revised safety authorization basis, determined that certain upgrades within the approved 1995 baseline were no longer required and/or cost effective. This enabled the DOE to reduce the scope of this project and resulted in the TEC being reduced from \$174,100,000 to \$106,020,000. The bulk of the cost savings were achieved through the cancellation of several existing subprojects.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost (\$000)	Total Project Cost (\$000)
	Title I & II A-E Work Initiated	Title I & II A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 1995 Budget Request ^a	1Q 1992	1Q 1997	3Q 1993	4Q 2003	194,750	204,000
FY 1996 Budget Request	1Q 1992	1Q 1997	3Q 1993	4Q 2004	194,750	204,000
FY 1997 Budget Request	1Q 1992	1Q 1999	3Q 1993	4Q 2002	174,100	223,635
FY 1998 Budget Request ^b	1Q 1992	1Q 1999	3Q 1993	4Q 2002	174,100	223,635
FY 1999 Budget Request	1Q 1992	1Q 1999	3Q 1993	4Q 2002	174,100	223,635
FY 2000 Budget Request	1Q 1992	1Q 1999	3Q 1993	4Q 2004	174,100	223,635
FY 2001 Budget Request (<i>Revised Baseline Estimate</i>) ^c	1Q 1992	2Q 2001	3Q 1993	2Q 2002	106,020	128,568

^a Prior to FY 1995, CMR Upgrades Phase I was a subproject within Nuclear Weapons Research Development and Testing Facilities Revitalization, Phase III (90-D-102). In FY 1995, Phase I was segregated and the scope of Phases 2 and 3 were added to create this stand alone Line Item project.

^b The project was restarted to address safety and reliability requirements as an outcome of the facility Basis for Interim Operations (BIO) Review and Associated Technical Safety Requirements (TSRs).

^c Re-baselining of the CMR Upgrades Project was completed on September 30, 1999. The FY 2001 Budget Request numbers have been modified to reflect this change.

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
1992	18,250 ^a	18,250	2,757
1993	10,000	10,000	5,061
1994	10,250	10,250	10,504
1995	3,300	3,300	13,363
1996	10,940 ^b	10,940	14,909
1997	15,000	4,000	10,081
1998	5,000 ^c	10,800	2,813
1999	5,000 ^d	5,000	6,283
2000	14,943 ^e	14,943	15,729
2001	13,337 ^f	13,337	11,693
2002	0	5,200	12,827
2003	0	0	0

^a \$6,250,000 was reprogrammed to CMR, Phase 1 subproject of Nuclear Weapons Research, Development and Testing Facilities Revitalization Phase 3 (90-D-102) from Special Nuclear Materials Laboratory Replacement Project (88-D-105). Reprogramming 91-R-14 was executed in FY 1992.

^b \$1,000,000 was reprogrammed by DOE Internal Reprogramming to the CMR Upgrades Project (95-D-102) in the 1st Qtr. FY 1996 from Special Nuclear Materials Laboratory Replacement Project (88-D-105).

^c Congress provided appropriations below the original request (\$15,700,000) based on DOE input relating to estimated impact of project suspension.

^d FY 1999 funding reduction from that presented in the FY 1998 CPDS is based on suspension and restart activities and Congressional reductions. Funding in FY 1999 was applied to design and construction of upgrades identified as necessary in the first workshop, to address public safety risks and compliance until the re-baselining effort was complete.

^e Original appropriation was \$15,000,000. This was reduced by \$57,000 for the FY 2000 rescission enacted by P.L. 106-113.

^f The FY 2001 funding request is based on the revised baseline issued on 9/30/99. The funding will be applied to subprojects supporting Basis for Interim Operations (BIO), address worker safety risks, and facility operability.

3. Project Description, Justification and Scope

The primary purpose of this project is to upgrade facility systems and infrastructure that have been in continuous operation for over 40 years and are near the end of their useful life. Such upgrading will ensure the continued safety of the public and LANL employees and increase the operational safety and reliability of essential activities. Increased safety, reliability, and security are critical to the continued operation of LANL's Stockpile Operations Programs and other national defense programs.

The CMR Upgrades Project was initiated in FY 1992 and re-baselined in FY 1995. The project was split into Phase 1 and Phase 2 subprojects, and the congressionally approved CMR Upgrades TEC was \$174,100,000 and the TPC was \$223,635,000. The majority of work completed between FY 1992 and FY 1997 addressed design and construction of Phase 1 subprojects. The project was suspended due to management concerns in April of 1997.

Project re-evaluations began in October 1997 to determine the minimum set of necessary upgrades to support safe operations through FY 2010. Workshops focused on required upgrades driven by the facility Basis for Interim Operations/Technical Safety Requirements (BIO/TSRs) implementation, as well as worker risk reduction and operability/reliability improvements. In the interim (October 1997 through September 1999), the project proceeded with design and construction of individual subprojects, under incremental authorizations, until the re-baselining effort was complete. The revised baseline has eliminated the distinction of Phase 1 and Phase 2 upgrades and reflects the updated project objectives of supporting safe operation through FY 2010 and accomplishing the minimum required upgrades. The TEC of \$174,100,000 has been reduced to \$106,020,000 and likewise, the TPC of \$223,635,000 has been reduced to \$128,568,000. The project will be completed by April of 2002.

The CMR Building is the largest structure at the Los Alamos National Laboratory (550,000 square feet). Construction of the CMR Building was completed in 1952. Most of the major mechanical and electrical equipment has reached the end of its design life. Since its construction over 40 years ago, the CMR Building has been used for research, development, and analytical work with plutonium, uranium and their alloys, and other materials in support of weapons, nuclear materials, and other LANL programs. This work continues to be essential to the nation's weapons program, with the principal activities in the building being in support of the plutonium research, development, and demonstration activities conducted at LANL's Plutonium Handling Facility at TA-55.

Key CMR capabilities and their tie to DOE missions include:

- Actinide analytical chemistry and materials characterization capabilities that support Defense Programs projects in pit surveillance, pit manufacturing, stockpile lifetime extension, and nuclear weapons certification.
- Analytical chemistry, uranium processing, destructive/non-destructive analysis of nuclear material samples, actinide research, processing, and fabrication, and metallography that support DOE's Environmental Management, Nuclear Energy, Materials Disposition, Nonproliferation and National Security, and Defense Programs.
- Waste characterization and remote handling of highly radioactive materials that support a variety of DOE nuclear materials management programs.

The CMR Building's future role is also essential for support of several major Defense Programs and DOE programs. They are as follows:

- Enhanced Safety and Reliability of Nuclear Weapons
- Lead Technical Laboratory for Pu and U Processing
- Weapons Dismantlement and Component Storage
- Materials Disposition
- Nonproliferation
- Pit Production

CMR Upgrades Completed, Canceled, or Rescoped Subprojects

Continuous Air Monitor (CAM) Installations – Completed.

Uninterruptable Power Supply (UPS) Installation – Completed.

Sanitary Sewer Upgrades – Completed.

Fire Hazard Analysis (Formerly Fire Protection Upgrades) – Completed.

Safety Analysis Report – Completed.

Engineering Assessments/CDR/EA – Completed.

- | **HVAC Blowers and Motors** – Canceled.
- | **Acid Vents and Drains Upgrades** – Canceled.
- | **Seismic and Tertiary Confinement (Wings 3, 5, 7, and 9)** – Canceled.
- | **Wing 1 (HVAC) Upgrades/Wing 1 Interim Decontamination** – Canceled.
- | **Process Chilled Water (Wings 3, 5, and 7)** – Canceled.
- | **Main Vault** – Canceled.
- | **ES&H Support Activities** – Canceled.
- | **Electrical Upgrades** – Rescoped.
- | **Stack Monitors Upgrade** – Rescoped.
- | **Duct Modification** – Rescoped
- | **Ventilation and Confinement Zone Separation (Wings 3, 5, 7, and 9)** – Rescoped.
- | **Operations Center (Administration Wing)** – Rescoped.
- | **Fire Protection Upgrades (Entire Facility)** – Rescoped.

| # **CMR Upgrades Continuing Subprojects**

| **Motor Control Centers**

| This scope of work included the construction, equipment installation, testing, acceptance, and turnover activities associated with specified MCCs to correct and prevent BUS connection failures.

| **Fire Alarm Control Panels**

| The scope of work included the replacement of the existing Fire Alarm Control Panels (FACP) in Wings 1, 2, 3, 4, 5, 7, 9 and the Administration area, installation of a new Master FACP, and

| installation of a new concentrator.

| **Transient Combustible Loading**

| The scope of work included procurement and installation of metal furniture, cabinets, bins, and
| boxes in order to meet the requirements defined in the CMR Technical Safety Requirements
| regarding transient combustible control.

| **Air Compressor Replacement**

| The scope of work includes design, construction, procurement, equipment installation, testing,
| acceptance, and turnover activities associated with the replacement of the main air compressor for
| the CMR Facility.

| **HVAC Differential Pressure Indicators**

| The scope of work includes design and construction activities to complete the installation and
| upgrades to the HVAC differential pressure indicators in Wings 2, 3, 4, 5, 7, and 9.

| **Duct Wash Down System (Wings 3, 5, & 7)**

| The scope of work includes the assessment, design, construction, procurement, equipment
| installation, testing, acceptance, and turnover activities associated with the modification of the
| Duct Wash Down System.

| **Stack Monitors FE 14, 19, 20, 23, 24, 28, & 32**

| The scope of work includes design, construction, procurement, equipment installation, testing,
| acceptance, and turnover activities associated with the modification of the stack monitoring
| systems in order to be fully compliant with 40CFR 61.

| **Ventilation System Filter Replacement Assessment and Procurement**

| The scope of work includes procurement of replacement filters, development of procedures for
| construction, testing, and acceptance activities associated with assessing perchlorate salt
| contaminated filters and fire screens in the main exhaust plenums of Wings 2, 3, 5, and 7. Wings 2,
| 5, and 7 contain HEPA filters and Wing 3 contains cartridge filters.

Wing 9 Ventilation Assessment

The scope of work includes assessment of existing Wing 9 ventilation system and conceptual design of required modifications.

Emergency Personnel Accounting System

The scope of work includes design, construction, procurement, equipment installation, testing, acceptance, and turnover activities associated with the installation of a system that will enable the expeditious accounting of personnel evacuating a specific wing or the entire facility.

Hood Wash Down

The scope includes design, construction, procurement, equipment installation, testing and acceptance activities associated with the replacement of one existing perchloric hood in Wing 5. Any future perchlorates will be eliminated through the use of an in-hood, water-aspirator scrubber system that will eliminate 90% of the perchlorates fumes and discharge the waste through the acid wash down system.

Stack Monitors FE 15, 29, & 33

The scope of work includes design, construction, procurement, equipment installation, testing, acceptance, and turnover activities associated with the modification of the stack monitoring systems in order to be fully compliant with 40CFR 61.

Interim Project Management

The scope of work includes the costs for staff and contracts associated with the overall management of the CMR Upgrades Project during the interim period from restart through September 30, 1999. The project personnel include LANL and subcontractor support in order to implement and operate the CMR Upgrades Project in compliance with current DOE Guidance. This includes: baseline development and maintenance; project scheduling; procedure maintenance; project reporting; training for project; procedure development; procurement functions; Quality Assurance support; development of project procedures; development of safety plans and design criteria; and project training. In addition, the scope includes labor for administrative and clerical personnel; material and supply costs for operation of the project; travel reimbursement, subcontractor costs for office machine maintenance costs, and computer maintenance.

Ventilation System Filter Replacement Design & Construct

The scope of work includes design, construction, equipment installation, waste treatment, acceptance, and turnover activities associated with replacing the perchlorate salt contaminated filters and fire screens in the main exhaust plenums of Wings 2, 3, 5, and 7. Wings 2, 5, and 7 contain HEPA filters and Wing 3 contains cartridge filters. The assessment and long-lead procurement portion of this project was initiated in June of 1999 and is currently on going. The design and construction of this scope will be initiated upon completion of the assessment.

Emergency Lighting

The scope of work will bring the facility into conformance with the Life Safety Code and address worker safety issues with regards to emergency lighting. This work will complete construction, testing, acceptance, and turnover activities that were in progress for Wing 1, 3, 5, 7, 9, and Administration, when the CMRU Project was suspended. It will provide design, construction, equipment installation, testing, acceptance, and turnover activities associated with the emergency and exit lighting system for Wings 2 and 4.

1952 Sprinkler Head Replacement

This scope of work includes the procurement, installation, testing, acceptance, and turnover activities associated with restoring the existing 1952 portion of the sprinkler system to a safe, fully operable, and reliable system.

West Bank Hot Cell Controls/Radiation Monitors

The scope of work includes design, construction, procurement, equipment installation, testing, acceptance, and turnover activities associated with adding a high radiation door interlock and restoring the existing Hot Cell door and corridor door controls for the West bank of hot cells in Wing 9 to a safe, fully operable, and reliable system.

West Bank Hot Cell Differential Monitors

The scope of work includes design, construction, procurement, equipment installation, testing, acceptance, and turnover of differential pressure monitors for each of the eight hot cells in the West bank of Wing 9 utilizing existing pressure taps.

Fire Protection System

The scope of work includes design, construction, procurement, equipment installation, testing, acceptance, and turnover of various field devices associated with the facility's fire alarm system. The various field devices include: revised system test drains, replacement of speaker strobe units, and install pressure gauges on sprinkler risers.

Emergency Notification

The scope of work includes design, construction, procurement, equipment installation, testing, acceptance, and turnover activities associated with the installation of an Emergency Notification System (ENS) at the CMR Facility to notify CMR employees, visitors, and workstations of all facility emergencies.

Operation Center

The scope of work includes design, procurement, construction, equipment installation, testing, acceptance and turnover of a new facility monitoring system to replace the existing obsolete system. The new off-the-shelf system will interface with new and existing sensors and programmable logic controllers installed as part of this and other upgrade subprojects to integrate critical facility system data generated throughout the CMR Facility into a single facility operator display and reporting system. This upgrade is essential to effectively implement the facility emergency management plan.

Internal Power Distribution

The scope of work includes design modifications, construction, procurement, equipment installation, testing, acceptance, and turnover activities associated with the limited completion of the upgrade to the Internal Power Distribution system of Wings 3, 5, and 7 of the CMR Facility. This includes completing installation of MCCs and PLCs in Wings 3, 5, and 7; providing an individual uninterruptible power supply (UPS) for each PLC cabinet; removing and disposing of old MCC equipment, conduit, and cable; and in Wing 9, connecting and configuring each new PLC with a UPS to the manually operating MCCs.

Project Management

The scope of work includes the costs for staff and contracts associated with the overall management of the CMR Upgrades Project for FY 2000 through FY 2002. It is anticipated that this team funding and size will stay constant through FY 2000 and FY 2001, and will be reduced in FY 2002. The project personnel include LANL and subcontractor support in order to implement and operate the CMR Upgrades Project in compliance with current DOE Guidance. This includes all project controls support, quality assurance support, administrative support, material and supply costs for operation of the project; travel reimbursement, subcontractor costs for office machine maintenance costs, and computer maintenance. Rather than prorate the project management infrastructure support to the individual subprojects, a precedent has been set to fund this support as a core control account.

Project Milestones:

YEAR	MILESTONE	SUBPROJECT
FY98	Start	Motor Control Centers
		Fire Alarm Control Panels
		Transient Combustible Loading
		Duct Wash Down
	Complete	Motor Control Centers

YEAR	MILESTONE	SUBPROJECT
FY99	Start	Hood Wash Down
		Emergency Personnel Accountability System
		Stack Monitors FE 15, 29, & 33
		HVAC Delta P Indicators
		Air Compressors Replacement
		Stack Monitors FE 14, 19, 20, 23, 24, 28, & 32
		Ventilation System Filter Replacement Assessment and Long-Lead Procurement
		Wing 9 Ventilation Assessment
		Re-Baselining (part of Interim Project Management)
		Design Criteria (part of Interim Project Management)
	Complete	Fire Alarm Control Panels
		Transient Combustible Loading
		Wing 9 Ventilation Assessment
		Re-Baselining (part of Interim Project Management)
		Design Criteria (part of Interim Project Management)

YEAR	MILESTONE	SUBPROJECT
FY00	Start	Ventilation System Filter Replacement Design & Construction
		West Bank Hot Cell Delta P Indicators
		West Bank Hot Cell Controls/Radiation Monitors
		1952 Sprinkler Head Replacement
		Emergency Notification System
		Emergency Lighting
		Internal Power Distribution
		Fire Protection System Upgrades
	Complete	Stack Monitors FE 14, 19, 20, 23, 24, 28, & 32
		HVAC Delta P Indicators
		Ventilation System Filter Replacement Assessment and Long-Lead Procurement
		Air Compressors Replacement
		Duct Wash Down
		1952 Sprinkler Head Replacements

YEAR	MILESTONE	SUBPROJECT
FY01	Start	Operations Center
	Complete	Emergency Lighting
		Internal Power Distribution
		Emergency Personnel Accountability System
		Fire Protection System Upgrades
		Hood Wash Down
		Stack Monitors FE 15, 29, & 33
		Ventilation System Filter Replacement Design & Construction
		Emergency Notification System
		West Bank Hot Cell Delta P Indicators

YEAR	MILESTONE	SUBPROJECT
FY02	Complete	West Bank Hot Cell Control/Radiation Monitors
		Operations Center

4. Details of Cost Estimate

(dollars in thousands)		
	Current Estimate	Previous Estimate
CMR Upgrades Prior to Project Suspension	56,874	N/A
Work Authorized from Project Restart October 1997 to Completion		
Design Phase		
Preliminary and Final Design Costs (Drawings and Specifications)	5,687	25,989
Design Management Costs (1.5% of TEC)	741	4,814
Project Management Costs (12.8% of TEC)	6,274 ^a	11,744
Total, Design Costs (25.9% of TEC)	12,702	42,547
Construction Phase		
Construction	20,017	77,640
Other Structures	0	4,174
Construction Management (1.7% of TEC)	818	5,391
Project Management (12.8% of TEC)	6,274	25,729
Total, Construction Costs (55.2% of TEC)	27,109	112,934
Contingencies		
Design Phase (4.8% of TEC)	2,334	5,031
Construction Phase (14.3% of TEC)	7,001	13,588
Total, Contingencies (18.9% of TEC) ^b	9,335	18,619
Total, Line Item Costs (TEC)	106,020	174,100

^a Includes rebaselining costs.

^b Contingencies represent approximately 8.8 % of TEC, and 18.9% of TEC for work authorized from project restart through completion.

5. Method of Performance

Procurement will be accomplished under fixed-price subcontracts awarded on the basis of competitive bidding. Consideration will be given to cost-plus-fixed fee on decontamination and refurbishment work on the CMR. Upgrades construction will be done by fixed price contractors and the Laboratory's support services subcontractor. The operating contractor and contracted Architect-Engineers will perform construction inspection.

6. Schedule of Project Funding

(dollars in thousands)						
	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Costs						
Facility Costs						
Design	29,128	4,695	9,583	1,576	370	45,352
Construction	30,360	1,588	6,146	10,117	12,457	60,668
Total, Line item TEC	59,488	6,283	15,729	11,693	12,827	106,020
Total, Facility Costs (Federal and Non-Federal)	59,488	6,283	15,729	11,693	12,827	106,020
Other Project Costs						
Other project-related costs	12,968	1,980	2,100	2,000	3,500	22,548
Total, Other Project Costs	12,968	1,980	2,100	2,000	3,500	22,548
Total, Project Cost (TPC)	72,456	8,263	17,829	13,693	16,327	128,568

7. Related Annual Funding Requirements

(FY 2002 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs	22,800	10,000
Annual facility maintenance/repair costs	10,500	2,500
Programmatic operating expenses directly related to the facility	2,250	30,000
Capital equipment not related to construction but related to the programmatic effort in the facility	1,125	1,000
GPP or other construction related to the programmatic effort in the facility	1,125	1,000
Utility costs	3,600	2,450
Total related annual funding (operating from 2002 through 2010)	41,400 ^a	36,960

^a The increase in annual operating costs is attributed to the decision to maintain the current CMR Facility in a safe operating mode until a replacement facility is constructed and certified.